

Decision Rationale

Total Maximum Daily Load for the Shellfish Impairments in the Coan and Little Wicomico River Watersheds

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those water bodies identified as impaired by a state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety (MOS), that may be discharged to a water quality-limited waterbody.

This document will set forth the Environmental Protection Agency's (EPA's) rationale for approving the TMDLs for the shellfish harvesting (bacteriological) impairments on the Coan and Little Wicomico Rivers. EPA's rationale is based on the determination that these TMDLs meet the following eight regulatory conditions pursuant to 40 CFR §130.

- 1) The TMDLs are designed to implement applicable water quality standards.
- 2) The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.
- 3) The TMDLs consider the impacts of background pollutant contributions.
- 4) The TMDLs consider critical environmental conditions.
- 5) The TMDLs consider seasonal environmental variations.
- 6) The TMDLs include a margin of safety.
- 7) There is reasonable assurance that the TMDLs can be met.
- 8) The TMDLs have been subject to public participation.

II. Background

The Coan and Little Wicomico Watersheds are located in Northumberland County in Eastern Virginia. The Coan River watershed is 14,951 acres in size and is composed of mostly forested (49%) and agricultural (41%) lands. The Little Wicomico River watershed is 1,281 acres in size and is composed of mostly forested (63%) lands. Both watersheds are rural with developed lands making up less than 6% of each watershed.

In response to Section 303(d) of the CWA, the Virginia Department of Environmental Quality listed several segments in each of these watersheds on Virginia's 1998 Section 303(d) list as being unable to attain the production of edible and marketable natural resources use due to elevated levels of

fecal coliform bacteria. The criteria are in place to protect the public from health affects associated with the consumption bacteriologically contaminated shellfish. Virginia's 1998 Section 303(d) list identified nine segments of the Coan River and four segments of the Little Wicomico River as being impaired. Subsequent sampling has demonstrated that three of the nine segments of the Coan River and one of the four segments in the Little Wicomico River Watersheds are no longer impaired.

The impairment is based on restrictions placed upon the harvesting of shellfish from these waters. The restrictions which are issued by the Virginia Department of Health's Division of Shellfish Sanitation (DSS) are based on monthly monitoring data. DSS collects monthly fecal coliform bacteria samples from each of its sampling stations in the watershed. DSS calculates a geometric mean and 90th percentile concentration value based on the most recent 30-months of sampling data. The criteria calls for a 30-month geometric mean concentration of less than 14 most probable number (mpn)/100 ml and a 90th percentile, based on the same 30-months of data below 49 mpn/100ml. The criteria is identical to criteria developed under the National Shellfish Sanitation Program which is regulated by the U.S. Food and Drug Administration. Table 1 identifies the TMDL loadings for each impaired segment.

Table 1 - TMDL Loadings

Segment	Watershed	TMDL (cfu)	WLA	LA (cfu)	MOS
145-D	Coan River	1.31E+10	0	1.31E+10	Implicit
145-E	Coan River	6.02E+10	0	6.02E+10	Implicit
145-F	Coan River	5.75E+10	0	5.75E+10	Implicit
145-G	Coan River	1.94E+09	0	1.94E+09	Implicit
145-H	Coan River	2.11E+10	0	2.11E+10	Implicit
145-I	Coan River	5.45E+11	0	5.45E+11	Implicit
180	Little Wicomico	8.59E+10	0	8.59E+10	Implicit
180-A	Little Wicomico	7.47E+10	0	7.47E+10	Implicit
180-B 10-19	Little Wicomico	1.94E+11	0	1.94E+11	Implicit
180-B 10-20	Little Wicomico	1.94E+11	0	1.94E+11	Implicit

III. Discussion of Regulatory Conditions

EPA finds that Virginia has provided sufficient information to meet all of the eight basic regulatory requirements for establishing shellfish harvesting use impairment TMDLs for the Coan and Little Wicomico River Watersheds. EPA is therefore approving these TMDLs. Our approval is outlined according to the regulatory requirements listed below.

1) The TMDL is designed to meet the applicable water quality standards.

Segments of the Coan and Little Wicomico River Watersheds were listed as impaired due to restrictions placed on the harvesting of shellfish as a result of excessive concentrations of fecal coliform bacteria in the water column. Virginia developed these TMDLs to insure that they would meet the applicable criteria of a 30-month geometric mean of 14 mpn/100ml and a 90th percentile of 49 mpn/100 ml. The TMDLs were modeled by the Commonwealth using a volumetric load approach.

The Commonwealth collected 12-months (September 2001 through August 2002) of bacterial source tracking (BST) and fecal coliform data. The BST data was collected to determine the sources of fecal coliform to the watershed. The sources were broken down into five categories: human, pets, livestock, wildlife, and avian (wildlife). An average percent loading per source category was obtained by summing the monthly percent concentrations and dividing that summation by twelve. The Commonwealth then determined the 30-month geometric mean and 90th percentile concentrations for each impaired segment using data from February 2000 through August 2002, which coincides with the BST samples. The existing load was determined for each criteria by multiplying the existing 90th percentile and geometric mean concentrations by the water volume. The allowable load was determined by multiplying the criteria by the volume. The required reductions were determined by subtracting the allowable load from the existing load. The 90th percentile concentration was the more stringent criteria and was used for all of the TMDLs. The methodology employed by the Commonwealth was designed to attain the applicable criteria.

2) The TMDL includes a total allowable load as well as individual waste load allocations (WLAs) and load allocations.

Total Allowable Loads

Virginia indicates that the total allowable loading is the loading derived by multiplying the more stringent criteria by the volume of water. The total allowable loading contains the sum of the loads allocated to land-based precipitation-driven nonpoint source areas (forest and agricultural land segments) and point sources. Activities that increase the levels of fecal coliform to the land surface or their availability to runoff are considered flux sources. The actual value for total loading can be found in Table 1 of this document. The total allowable load is calculated on an annual basis.

Waste Load Allocations

There are no National Pollutant Discharge Elimination Program (NPDES) permitted facilities within either Watershed. Therefore, the WLA was zero for each watershed.

EPA regulations require that an approvable TMDL include individual WLAs for each point

source. According to 40 CFR 122.44(d)(1)(vii)(B), “Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA pursuant to 40 CFR 130.7.” Furthermore, EPA has authority to object to the issuance of any NPDES permit that is inconsistent with the WLAs established for that point source.

Load Allocations

According to Federal regulations at 40 CFR 130.2(g), load allocations (LAs) are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting loading. Wherever possible, natural and nonpoint source loads should be distinguished.

Load allocations were developed for each of the five fecal coliform source categories (avian (wildlife), human, pets, livestock, and wildlife). The loadings were not developed on a landuses basis. The implementation techniques needed to insure compliance with the TMDL will be applied to the landuse for the applicable sources. All of the TMDLs required reductions in loadings from humans. There were no reductions required from wildlife or pets. Table #2 documents the LAs for each source category of fecal coliform bacteria.

Table 2- Load Allocations by Source

Segment/ Watershed	Avian (cfu/yr)	Human (cfu/yr)	Pets (cfu/yr)	Livestock (cfu/yr)	Wildlife (cfu/yr)
145-D, Coan R.	5.50E+10	1.76E+11	9.73E+09	1.45E+10	2.31E+10
145-E, Coan R.	1.93E+10	2.64E+10	6.22E+09	3.46E+09	4.84E+09
145-F, Coan R.	2.08E+10	1.79E+10	3.96E+09	9.90E+09	4.95E+09
145-G, Coan R.	3.09E+08	1.15E+09	4.42E+07	2.65E+08	1.77E+08
145-H, Coan R.	1.21E+10	3.69E+07	6.36E+08	1.33E+09	7.00E+09
145-I, Coan R.	1.29E+11	2.64E+11	3.78E+10	4.54E+10	6.80E+10
180, Little Wicomico	1.26E+10	3.14E+10	6.19E+09	8.84E+09	7.96E+09
180-A, Little Wicomico	2.03E+10	3.14E+10	6.19E+09	8.84E+09	7.96E+09
180-B 10-19, Little Wicomico	4.10E+10	1.00E+11	7.68E+09	2.05E+10	2.56E+10
180-B 10-20, Little Wicomico	4.86E+10	8.20E+10	9.12E+09	2.43E+10	3.04E+10

3) The TMDL considers the impacts of background pollution.

Background pollutant contributions were considered in the modeling process by quantifying the fecal coliform loads from wildlife sources.

4) The TMDL considers critical environmental conditions.

According to the EPA regulation 40 CFR 130.7 (c)(1), TMDLs are required to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of the Coan and Little Wicomico River watersheds were protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards¹. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable “worst-case” scenario condition. For example, stream analysis often uses a low-flow (7Q10) design condition because the ability of the waterbody to assimilate pollutants without exhibiting adverse impacts is at a minimum. These critical conditions ensure that water quality standards will be met for other than worst case scenarios. By quantifying the TMDL load reductions to the more stringent criteria the TMDL is insuring the standards are maintained during critical conditions.

5) The TMDLs consider seasonal environmental variations.

Seasonal variations involve changes in stream flow as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flows normally occur in early spring from snow melt and spring rain, while seasonally low flows typically occur during the warmer summer and early fall drought periods. Source loadings were investigated on a monthly basis to determine if seasonality existed, based on the results it was determined that there was minimal seasonal impacts to loading and the source loads were averaged on an annual basis.

6) The TMDLs include a margin of safety.

This requirement is intended to add a level of safety to the modeling process to account for any

¹EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

uncertainty. The MOS may be implicit, built into the modeling process by using conservative modeling assumptions, or explicit, taken as a percentage of the WLA, LA, or TMDL. Virginia included an implicit MOS in the TMDLs for the Coan and Wicomico River Watersheds by not accounting for flushing of the tidal system and by targeting the highest level at which the ambient levels exceed the water quality standard.

7) There is a reasonable assurance that the TMDL can be met.

EPA requires that there be a reasonable assurance that the TMDL can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA. Furthermore, EPA has authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for that point source.

Nonpoint source controls to achieve LAs can be implemented through a number of existing programs such as Section 319 of the CWA, commonly referred to as the Nonpoint Source Program.

The TMDL in its current form is designed to meet the applicable water quality standards. The Commonwealth intends to implement this TMDL through best management practices (BMPs). The implementation of these practices will occur in stages. This will allow the Commonwealth to monitor the benefits of the BMPs and determine which practices have the greatest impacts on water quality. It will also provide a mechanism for developing public support and checking the accuracy of the model.

8) The TMDLs have been subject to public participation.

Two stakeholder meetings were held in the Northumberland County Library in Heathsville, Virginia. The meetings were held in February 2002 and May 2003. Sixteen people representing various government, citizen, and research groups attended. A public meeting was held on July 22, 2003. The meeting was public noticed on June 30, 2003 in the Virginia Register, it was also noticed in two local newspapers. Approximately 20 people from various government and citizen groups attended the public meeting.